

WHAT IS CLAIMED IS:

1 ¹ A method of treating chemical cellulose pulp produced by
 2 alkaline delignification and having a kappa number of under 24,
 3 having hexenuronic acid therein, comprising the steps of:
 4 (a) treating chemical cellulose pulp produced by alkaline
 5 delignification having a kappa number under 24 by removing at least
 6 50% of the hexenuronic acid from the pulp; and
 7 (b) bleaching the chemical cellulose pulp produced by alkaline
 8 delignification having a kappa number under 24 in at least one
 9 bleaching stage.

1 2. A method as recited in claim 1 wherein step (a) is practiced
 2 by treating the pulp at a temperature over 85°C and at a pH between
 3 about 2-5 for sufficient time to remove at least 50% of the hexenuronic
 acid and to reduce the kappa number by at least 2 units.

1 3. A method as recited in claim 2 wherein step (a) is practiced
 2 for at least a time t, where $t = 0.5 \exp(10517/(T+273)-24)$, in minutes,
 3 and where T is the treatment temperature in degrees C.

1 4. A method as recited in claim 2 wherein step (b) is practiced
 2 by bleaching the pulp with chemicals reacting electrophilically in at
 3 least one stage, and wherein step (a) is practiced before step (b).

1 5. A method as recited in claim 4 wherein step (b) is practiced
 2 by chlorine, chlorine dioxide, ozone, or peracid bleaching.

a

1 6. A method as recited in claim ~~3~~¹ wherein step (a) is practiced
2 with the pulp at a consistency of between 1-20%.

a

1 7. A method as recited in claim ~~6~~¹ wherein step (a) is practiced
2 at a temperature of between about 90-110°C, and a pH of between
3 about 2.5-4.

a

1 8. A method as recited in claim ~~7~~¹ wherein step (a) is practiced
2 by controlling the pH by the addition of an inorganic or organic acid,
3 and at a temperature over 100°C.

1 9. A method as recited in claim ~~2~~¹ wherein step (a) is practiced
2 for between 5 minutes to 10 hours.

a

1 10. A method as recited in claim ~~9~~¹ wherein step (a) is practiced
2 for sufficient time to remove at least 80% of the hexenuronic acid.

1 11. A method as recited in claim 10 wherein step (a) is
2 practiced at a temperature of between about 90-110°C and a pH of
3 between about 3-4 for between 10-240 minutes.

1 12. A method as recited in claim 1 wherein the pulp treated in
2 step (a) is hardwood pulp having a kappa number of about 14 or less.

1 13. A method as recited in claim 1 wherein step (b) is practiced
 2 by bleaching the pulp in an ozone stage, followed by at least one
 3 additional bleaching stage.

a 14. A method as recited in claim 1 wherein step (b) is practiced
 2 by bleaching the pulp with a single hydrogen peroxide stage, and no
 3 other bleaching stages, to produce pulp having a ^{post color} ~~pc~~ number of less
 4 than 2.

1 15. A method as recited in claim 1 wherein step (b) is practiced
 2 by bleaching the pulp in an oxygen stage, followed by at least one
 3 additional bleaching stage.

a 16. A method as recited in claim 1 wherein step (a) is practiced
 2 to reduce the kappa number about 3-6 units, and to remove at least
 3 80% of the hexenuronic acid, and so that the pulp produced has a ^{post color} ~~pc~~
 4 number less than 2.

1 17. A method as recited in claim 3 comprising the further step
 2 of delignifying the pulp with oxygen prior to step (a) so that it has a
 3 kappa number of about 14 or less; and wherein step (b) is practiced
 4 after step (a).

1 18. A method of producing chemical cellulose pulp, comprising
 2 the steps of: ✓

3 (a) effecting alkaline delignification of comminuted cellulosic
4 fibrous material to produce chemical cellulose pulp having a kappa
5 number of under 24, and having hexenuronic acid therein;

6 (b) treating the chemical cellulose pulp from step (a) at a
7 temperature of between about 90-180°C and at a pH between about 2-
8 5 for at least a time t , where $t = 0.5 \exp(10517/(T+273)-24)$, in
9 minutes, and where T is the treatment temperature in degrees C, to
10 remove at least 50% of the hexenuronic acid from the pulp; and

11 (c) bleaching the chemical cellulose pulp from step (a) in at least
12 one bleaching stage prior to, simultaneously with, or after step (b).

1 19. A method as recited in claim 18 wherein step (b) is
2 practiced at atmospheric pressure for a time between 10-360 minutes,
3 or at super atmospheric pressure and a temperature of over 100°C for
4 a time between 5-100 minutes, and to remove about ⁸⁰~~90~~-97% of the
5 hexenuronic acid.

1 20. A cellulose chemical pulp produced by the steps of:

2 (a) effecting alkaline delignification of comminuted cellulosic
3 fibrous material to produce chemical cellulose pulp having a kappa
4 number of under 24, and having hexenuronic acid therein;

5 (b) treating the chemical cellulose pulp from step (a) at a solids
6 consistency between 0.1-50% at a temperature of between about 90-
7 180°C and at a pH between 2.0-5.0 for at least a time t , where $t = 0.5$
8 $\exp(10517/(T+273)-24)$, in minutes, and where T is the treatment
9 temperature in degrees C, to remove at least 50% of the hexenuronic
10 acid from the pulp; and

a 11 (c) bleaching the chemical cellulose pulp from step (a) in at least
 12 one bleaching stage prior to, ~~simultaneously with~~, or after, step (b), so
 13 that the pulp has a brightness of at least about 80 ISO.

1 21. A cellulose chemical pulp as recited in claim 20 wherein step
 2 (c) is practiced using hydrogen peroxide, and wherein the ~~pc~~ ^{post-color} number of
 3 the pulp is less than two. ~~AM~~

add
A2

add
C'